CLAIMS

1. A membrane electrode assembly for a proton-exchange membrane fuel cell, comprising a polymer electrolyte membrane and an electrode catalyst layer,

wherein at least a part of the polymer electrolyte membrane infiltrates into the electrode catalyst layer, and

wherein the polymer electrolyte membrane is formed by polymerizing a composition containing at least a compound having proton conductivity and a compound having activity to an active energy ray, or a composition containing at least a compound having proton conductivity and activity to the active energy ray.

2. A membrane electrode assembly according to claim 1, wherein a reinforcement member composed of an electrical insulator is provided inside the polymer electrolyte membrane.

3. A production method for a membrane electrode assembly for a proton-exchange membrane fuel cell, the assembly comprising a polymer electrolyte membrane and an electrode catalyst layer, at least a part of the polymer electrolyte membrane infiltrating into the electrode catalyst layer, the production method comprising the steps of:

coating the electrode catalyst layer with a composition containing at least a compound having

proton conductivity and a compound having activity to an active energy ray, or a composition containing at least a compound having proton conductivity and activity to the active energy ray, to form a precursor layer of the polymer electrolyte membrane composed of the composition, at least a part of the composition infiltrating into the electrode catalyst layer; and

polymerizing the composition by irradiating the precursor layer with the active energy ray, to form a polymer electrolyte membrane at least a part of which infiltrates into the electrode catalyst layer.

4. A production method for a membrane electrode assembly according to claim 3, wherein the electrode catalyst layer has a thickness of 0.01 to 200 μm, and an infiltration amount of the composition into the electrode catalyst layer is equal to or smaller than the thickness of the electrode catalyst layer.

5. A production method for a membrane electrode assembly according to claim 3, wherein the composition is coated after a reinforcement member composed of an electrical insulator is provided on the electrode catalyst layer.

6. A proton-exchange membrane fuel cell comprising a membrane electrode assembly for a proton-exchange membrane fuel cell, the membrane electrode assembly comprising a polymer electrolyte

membrane and an electrode catalyst layer,

wherein at least a part of the polymer electrolyte membrane infiltrates into the electrode catalyst layer, and

wherein the polymer electrolyte membrane is formed by polymerizing a composition containing at least a compound having proton conductivity and a compound having activity to an active energy, or a composition containing at least a compound having proton conductivity and activity to the active energy ray.